

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-063968

(43)Date of publication of application : 10.03.1995

(51)Int.Cl.

G02B 7/02  
B29C 45/16  
B29D 11/00

(21)Application number : 05-229416

(71)Applicant : SONY CORP

(22)Date of filing : 23.08.1993

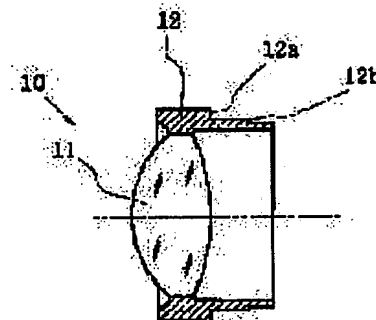
(72)Inventor : YAMAMOTO TAKASHI

## (54) OPTICAL COMPONENT AND ITS PRODUCTION

## (57)Abstract:

**PURPOSE:** To produce an optical component in a short time, to make it excellent in optical performance and to make it endurable to long-term use by integrally molding an optical element part and a supporting part for the element.

**CONSTITUTION:** The optical component 10 is constituted of the optical element 11 such as a lens, and the supporting part 12 supporting the element 11. The element 11 consists of a convex lens, is arranged on a specified optical path, and focuses light. The convex lens part 11 is formed out of a synthetic resin and the resin for optical parts which is ordinarily used is selected in this case. The supporting part 12 has a function for preventing the deformation of the convex lens 11 and protecting the lens 11. Different kinds of synthetic resin are used for the element 11 and the supporting part 12 for the element 11, and the element 11 and the supporting part 12 are simultaneously molded by simultaneously injecting the different kinds of synthetic resin from a resin injecting device and performing two-color molding. Therefore, work for combining them is eliminated, and the attaching error of both of them is prevented.



## LEGAL STATUS

[Date of request for examination] 19.07.2000

[Date of sending the examiner's decision of rejection] 04.06.2002

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

**\*NOTICES \***

JPPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**CLAIMS**

---

- [Claim(s)]
- [Claim 1] the supporter of the above-mentioned optical element section which was formed in the optical element section which consisted of the 1st resin ingredient, this optical element section, and one at coincidence, and consisted of the 2nd resin ingredient, and the optical component characterized by coming to come out.
- [Claim 2] The optical component according to claim 1 characterized by said optical elements being two or more optical elements from which a class differs.
- [Claim 3] The manufacture approach of the optical component characterized by injecting the resin ingredient of a different class to coincidence from one resin injection equipment which injects two or more resin injection equipments and/or two or more resin ingredients which were connected to one injection molding machine, and really fabricating the optical element section and the supporter which supports this optical element section.
- 

[Translation done.]

## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

DETAILED DESCRIPTION

---

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the optical component which becomes with optical elements, such as a lens arranged on photography optical system, such as a video camera, and the supporter which supports this optical element, and its manufacture approach.

[0002]

[Description of the Prior Art] Conventionally, in such an optical component, optical elements, such as a lens, and the supporter of this optical element were manufactured separately. That is, the optical lens section is manufactured by an acrylic, the polycarbonate, etc. by injection molding or injection compression molding as a seed.

[0003] On the other hand, the perimeter of this optical lens section was surrounded, the supporter (support device section) of the optical element which has the predetermined installation section etc. carried out cutting of the predetermined ingredient, or fabricated it, and manufactured it, and, finally the optical component was manufactured by assembling two components of the above-mentioned optical element and a supporter.

[0004]

[Problem(s) to be Solved by the Invention] By the way, in such an optical component, the process which assembles an optical element and its supporter is needed, and there is a fault that the part manufacture takes time and effort. Moreover, it will respond like this assembler, a subsidiary material etc. will be needed, and that part manufacturing cost will become high.

[0005] Furthermore, it sets like this assembler, the installation error of an optical element and supporter material arises, and, thereby, the optical-character ability of an optical component falls. And as a result of assembling, when this is used for a long period of time, corresponding to secular change of an assembly part, there is also a problem that it is inadequate in respect of dependability, such as optical-character ability, etc.

[0006] In view of the above point, this invention can be manufactured in a short time, moreover, is excellent in optical-character ability, and aims at offering the optical component which is equal to prolonged use, and its manufacture approach.

[0007]

[Means for Solving the Problem] According to this invention, the above-mentioned purpose is attained by the optical component which becomes with the supporter of the above-mentioned optical element which was formed in the optical element section which consisted of the 1st resin ingredient, this optical element section, and one at coincidence, and consisted of the 2nd resin ingredient. Preferably, said optical element section consists of two or more optical elements from which a class differs.

[0008] Moreover, the above-mentioned purpose injects the resin ingredient of a different class to coincidence from one resin injection equipment which injects two or more resin injection equipments and/or two or more resin ingredients which were connected to one injection molding machine, and is attained by the manufacture approach of the optical component which really fabricates the optical element section and the supporter which supports this optical element section.

[0009]

[Function] According to the above-mentioned configuration, since an optical element and its supporter are really fabricated, it can manufacture with 2 color shaping within the same mold in a short time. And since an optical element and a supporter are assembled, it is not unifying and the installation error accompanying this etc. is not produced, the spectroscopy engine performance improves.

[0010]

[Example] Hereafter, the suitable example of this invention is explained to a detail, referring to an accompanying drawing. In addition, since the example described below is a suitable example of this invention, desirable various

limitation is attached technically, but especially the range of this invention is restricted to these modes, as long as there is no publication of the purport which limits this invention in the following explanation.

[0011] Drawing 1 is the outline sectional view showing the 1st desirable example of the optical component of this invention. In drawing, the optical component 10 consists of optical elements 11, such as a lens, and a supporter 12 which supports this optical element 11. In illustration, the optical element 11 has become with the convex lens, is arranged on a predetermined optical path, and can converge light.

[0012] This convex lens section 11 is formed with synthetic resin, and the resin for optics usually used is selected. For example, the convex lens section (optical element) 11 is formed by using suitably an acrylic (PMMA), a polycarbonate (PC), conversion acrylic resin, etc.

[0013] A supporter 12 prevents deformation of a convex lens 11 etc., and has the function to protect this. In the case of this example, this supporter 12 is constituted by tubed [ which carries out hold support of the above-mentioned convex lens 11 ]. The diameter of the outer diameter of this tubed supporter 12 is gradually reduced by forming Steps 12a and 12b toward the method of the right in drawing 1 . Using this diameter reduction section and each steps 12a and 12b, within equipments, such as a miniature camera which should hold an optical component 10, a supporter 12 is attached on a predetermined optical path, and is arranged.

[0014] Drawing 2 shows the modification of the above-mentioned example, drawing 2 (A) is the outline sectional view of an optical component, and drawing 2 (B) is the outline front view of an optical component. In this optical component 20, the supporter 22 has composition formed in one to the side face of the lens 21 as an optical element.

[0015] Here, the lens section 21 as an optical element is constituted as a concave lens. The supporter 22 is equipped with bearing 22a, and can fix it to this bearing through a revolving shaft or a rotation shaft. Thereby, the lens section 21 can be rotated now in the direction of an arrow head with rotation of a rotation shaft. Therefore, a supporter 22 can be considered as the configuration which serves as the device section for moving an optical element (section) 21.

[0016] Next, the manufacture approach of an above-mentioned optical component is explained. First, an injection molding machine equipped with the mold for shaping corresponding to the configuration of the optical component which should be manufactured is prepared. The resin injection equipment which can inject the synthetic resin of two kinds or the class beyond it is connected to this resin making machine.

[0017] In this case, resin injection equipment may use what injects two or more kinds of resin alone, and you may make it connect two or more injection equipments which inject one kind of synthetic resin. Subsequently, the synthetic resin of a class which is different from this resin injection equipment is injected to coincidence, and the so-called two color molding is performed. This fabricates the optical element section and its supporter to coincidence.

[0018] Therefore, while the activity which combines optical elements, such as a lens, and the support (device) of those like before becomes unnecessary and being able to reduce a man day, the part manufacturing cost can be lowered. Although it set like the assembler and the subsidiary material, the facility, etc. were needed in this point and the former, these also all become unnecessary in the optical component of this example.

[0019] And since an optical element and its supporter are not assembled, both installation error does not arise. For this reason, the optical-character ability which was far superior to the conventional optical component can be obtained, for example by [ , such as a photography camera for videos, and a small photograph camera, ] incorporating. In this case, since this optical component 10 is not manufactured according to an assembly, it attaches, even if it uses it for a long period of time, and deformation etc. is produced in a part, and the engine performance does not deteriorate.

[0020] Drawing 3 shows the 2nd example of the optical component of this invention. The optical element section 34 of this optical component 30 has become by two kinds of optical elements. That is, the optical element section 34 has become with the cylindrical lens 32 and the convex lens 31, and these are prepared in one supporter 33. In this case, the bearing 35 which can carry out insertion immobilization of the rotation shaft etc. is formed in one to this supporter 33 so that a supporter body can be horizontally rotated in drawing at the end of a supporter 33.

[0021] Thereby, this optical component 30 can form the optical system in alignment with the specific purpose by being included in predetermined optical system using each lenses 31 and 32. And by connecting a supporter 33 to a predetermined rotation device etc., the motion which suited the function of equipment in which an optical component 30 should be incorporated can be attained.

[0022] In addition, also in this optical component 30, the optical element section 34 and a supporter 33 are manufactured by coincidence by two color molding using another resin ingredient. In this case, you may make it choose another resin ingredient according to the function of each lens of the optical element section 34 further. In this way, even if it is in an optical component 30, the same operation effectiveness as an above-mentioned

example can be done so.

[0023] Drawing 4 shows the 3rd example of the optical component of this invention. In the optical component 40 of this example, the concave lens 41 which forms the optical element section 44, and the cylindrical lens 42 are constituted by one, and, moreover, differing from the above-mentioned optical component 30 is the point that the cylindrical lens 42 is formed in the concave lens 41.

[0024] Thereby, the optical element section 44 can be formed small and that spectroscopy component 40 whole can consist of this optical component 40 in a compact. Moreover, the bearing 45 which can carry out insertion immobilization of the rotation shaft etc. is formed in one to this supporter 43 so that a supporter body can be perpendicularly rotated in drawing at the end of a supporter 43.

[0025] Therefore, since this optical component 40 can be manufactured by the same approach as the optical component of the 1st and 2nd above-mentioned examples and does not require like an assembler, it has the same advantage.

[0026] In addition, this invention is not limited to an above-mentioned example. For example, all optical elements, such as not only various kinds of lenses but prism, can be formed in the optical element section. Moreover, if a supporter can also be fabricated in one mold, the thing of various configurations can be formed.

[0027]

[Effect of the Invention] The optical component in which the engine performance does not deteriorate even if it can manufacture at \*\*\*\* by this invention and one process in a short time, it moreover excels in optical-character ability and a long period of time uses it, as stated above, and its manufacture approach can be offered.

---

[Translation done.]

\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

DESCRIPTION OF DRAWINGS

---

[Brief Description of the Drawings]

[Drawing 1] It is the outline sectional view showing the 1st example of the optical component of this invention.

[Drawing 2] It is the schematic diagram showing the modification of the optical component of drawing 1 .

[Drawing 3] It is the outline sectional view showing the 2nd example of the optical component of this invention.

[Drawing 4] It is the outline sectional view showing the 3rd example of the optical component of this invention.

[Description of Notations]

10 Optical Component

11 Optical Element Section (Convex Lens)

12 Supporter

20 Optical Component

21 Optical Element Section (Concave Lens)

22 Supporter

30 Optical Component

31 Convex Lens

32 Cylindrical Lens

33 Supporter

34 Optical Element Section

40 Optical Component

41 Concave Lens

42 Cylindrical Lens

43 Supporter

44 Optical Element Section

---

[Translation done.]

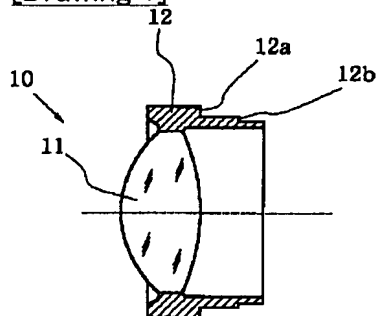
## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

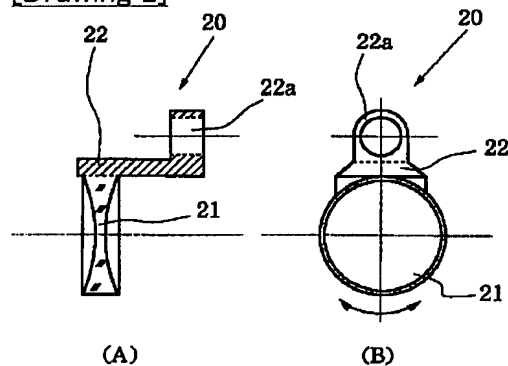
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

## DRAWINGS

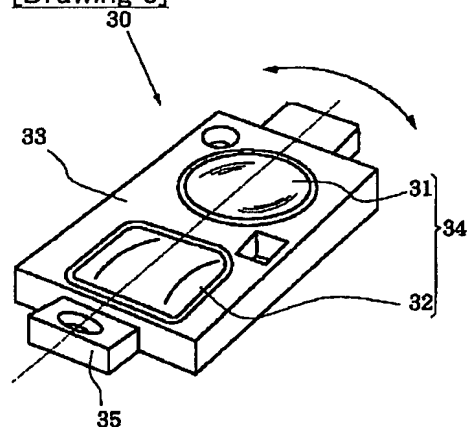
[Drawing 1]



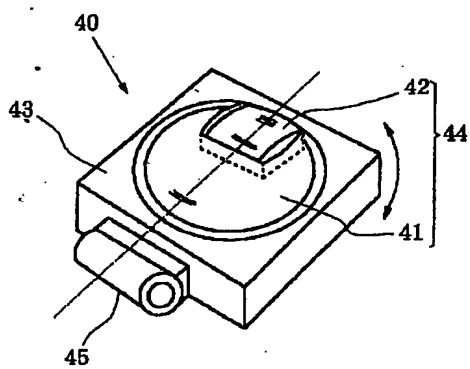
[Drawing 2]



[Drawing 3]



[Drawing 4]



---

[Translation done.]